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| 10/730,033 | 12/09/2003 | Toshihiko Ouchi | 03500.017455. | 3038 |
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| FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112 | | | KANG, JULIANA K | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2874 | |

DATE MAILED: 04/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/730,033 | Applicant(s) OUCHI, TOSHIHIKO | |
| | Examiner Juliana K. Kang | Art Unit 2874 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-16 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/9/03 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>1/27/04, 12/9/03</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. Figures 8A and 8B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The Examiner noticed a typographical error, themselves, in page 6 line 4. Applicant's assistance is requested to correct any other errors that may be noticed in the application.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3, 4, 7, 8, 9 and 10-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 3, in the fifth line and seventh line of claim 3, there is no antecedent support for the term "the transmitting source," thus rendering claim 3 (along with claims 4, 7 and 8 which depend therefrom) indefinite.

Regarding claim 9, in the third, fifth and sixth lines of claim 9, there is no antecedent support for the term "the light emitting elements," thus rendering claim 9 indefinite. The preceding claim 2 recites "a light-receiving element." It is not clearly to the Examiner if applicant's intention is to either to recite the same light-receiving element or recite additional light emitting elements. Also the last two lines of the claim recite the limitation "one single light-receiving element." This term makes the claim confusing because the term, " the light-receiving element" is already recited in the preceding claims. It is not clearly to the Examiner if applicant is adding another light-receiving element or referring to the same light-receiving element. For the Examiner purpose, the Examiner will interpret the recited "one single light-receiving element" as the same light-receiving element recited in the preceding claims.

Regarding claim 10, the term "and/or" in line 9, renders claim 10 vague and unclear. It is not clear to the Examiner if the term "and/or" applies to all three limitations i, ii, iii or just two limitations ii and iii. For the examining purpose, the Examiner will interpret so that "and/or" applies to all three limitations.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 5, 9 and 10 are rejected under 35 U.S.C. 102(a) as being anticipated by Heflinger (U.S. Patent 6,321,001 B1).

Regarding claim 1, Heflinger discloses an optical waveguide device comprising an optical waveguide layer (15) and a light-receiving element (46, 50), the optical waveguide being provided with a first light direction-altering means (28, 32) which alters the direction of a light propagated in the optical waveguide layer and directs the light to the light-receiving element, the light receiving element being provided with a plurality of light receiving portions (46a-e, 50a-e), being capable of receiving signals independently.

Regarding claim 2, Heflinger discloses the optical waveguide layer that is further provided with a light-emitting element (18) and a second light-direction-altering means (16) for receiving light emitted from the light-emitting element at an angle to an in-plane direction of the optical waveguide layer, wherein the second light direction-altering means and the light-emitting element are in such a relative position that light emitted from the light-emitting element is directed into the optical waveguide layer (see column 3 lines 10-16).

Regarding claim 5, Heflinger discloses the light-receiving element (46, 50) that includes a plurality of light-receiving portions (46a-e, 50a-e) linearly arranged (having only one dimension), and the first light direction-altering means allows the light-receiving element to receive light propagated from a predetermined region in the optical

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waveguide layer, and the light-receiving element discriminates the transmitting source of the received light based on a light intensity distribution (wavelength) that varies depending on the position of the transmitting source of light (see column 4 lines 41-62).

Regarding claim 9, as best understood by the Examiner with the rejections stated above, Heflinger discloses the device configured to propagate a plurality of different wavelengths in the optical waveguide layer to receive the signals by the light-receiving element (46, 50).

Regarding claim 10, Heflinger discloses an optical waveguide device comprising a waveguide layer, a plurality of light-emitting elements (18a-18e), a plurality of light direction-altering means (16), a plurality of light-receiving elements (46a-46e, 50a-50e), and a plurality of light direction-altering means (28, 32), wherein a light direction altering means and a light-receiving element are configured so that incident light is propagated from the light emitting element as parallel beams in a specific direction in the waveguide layer and an optical signal is detected discriminating the position of a light emitting element to simultaneously exchange a plurality of optical signals in the same optical waveguide layer (see column 4 lines 41-62).

8. Claims 10-13, 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Jannson et al (EP 0 322 218 A2, submitted by applicant).

Regarding claim 10, Jannson et al disclose the claimed optical waveguide device comprising a waveguide layer (12), a plurality of light-emitting elements (26), a plurality of light direction-altering means (28), a plurality of light-receiving elements (36), and a plurality of light direction-altering means (38), wherein a light direction altering means

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and a light-receiving element are configured so that incident light is propagated from the light emitting element at a specific emission angle in the waveguide layer (page 4 lines 45-47) and an optical signal is detected discriminating the position of a light emitting element to simultaneously exchange a plurality of optical signals in the same optical waveguide layer (page 4 lines 57-63).

Regarding claim 11, Jannson et al show transceivers and VLSI chips mounted on the waveguide layer 12 (see Fig. 2).

Regarding claim 12, Jannson et al disclose the claimed limitations of O/E and E/O conversion (see page 4 lines 15 and 55-56).

Regarding claim 13, Jannson et al show a layered substrate comprising an electric circuit and an optical waveguide device with electric connections to operate an electronic equipment wherein interconnection of all the signals from the circuit is carried out by exchange of optical signals (see Fig. 3).

Regarding claims 15 and 16, Jannson et al disclose the waveguide layer connected to an electric circuit board (the bottom substrate shown in Fig. 5) and an electronic chip. Jannson et al further show multi-layered waveguide layers in Fig. 7 with multi-bit wirings.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heflinger as applied to claims 10 and 13 above, and further in view of Glebov et al (U.S. Patent 6,603,915 B2).

As described above, Heflinger disclose the claimed invention except the optical device embedded within an electric circuit multiplayer substrate. Glebov et al teach multichip module packaging of integrate circuits using an optical device formed in an electric circuit multilayer substrate for faster and more compact configuration. Thus, it would have been obvious to one with ordinary skill in the art at the time the invention was made to embed the optical device of Heflinger in an electric circuit multilayer substrate to provide faster and more compact configuration as taught by Glebov et al.

Allowable Subject Matter

11. Claims 3, 4, 7 and 8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The closest prior art of record, Heflinger, does not teach or reasonably suggest the light-receiving element having a plurality of light-receiving portions arranged in a circle to receive the light from all directions traveling in the optical waveguide layer as set forth in claim 3, and there is no other prior art teaching that can be combined with the Heflinger reference to perform the identical function in applicant's invention.

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12. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The closest prior art of record, Heflinger, teaches gratings as light-altering means but does not teach or reasonably suggest the first light direction-altering means embedded in the optical waveguide layer in a form of a half cylindrical or triangular structure as recited in claim 6, and there is no other prior art teaching that can be combined with the Heflinger reference to perform the identical function in applicant's invention.

Conclusion

13. The prior art documents submitted by applicant have been considered and made of record (note the attached copy of form PTO-1449).

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pillkahn (U.S. Patent 6,396,968 B2) teach an optical signal transmission device. Hirota et al (U.S. Patent 5,822,475) teach using a transmission layer to simultaneous transmit the signal from one circuit board to a plurality of circuit boards. Hoffmann et al (U.S. Patent 6,678,439 B2) teach using a pyramidal structure to either multiplex or demultiplex the signals in an optical communication system.


15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (571) 272-

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2348. The examiner can normally be reached on Mon. & Fri. 10:00-6:00 and Tue. & Thur. 10:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Juliana Kang
April 1, 2004